

Effect of lead and zinc on germination and seedling growth of soybean (*Glycine max L.*)

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This study was conducted to determine the effect of different concentrations of lead and zinc on seed germination and seedling growth of soybean plant (*Glycine max L.*). Seeds were grown under laboratory conditions at (0, 0.5, 2.5, 4.5 and 6.5 mM) of lead (II) chloride and different concentrations of zinc chloride (5, 10, 15 and 20 mM). Both lead and zinc treatments showed toxic effects on seed germination percentage of soybean. With increasing concentration of lead chloride to 6.5 mM, significantly ($p < 0.05$) decreased seed germination as compared to control. However, in comparison with the control treatment, the lowest germination percentage determined at 15 mM zinc in the level ($P < 0.05$). The decrease of 28.24 and 33.17 % in germination rate was noticed following the treatment with 4.5- and 6.5-mM lead chloride compared with control treatment, respectively. But, zinc chloride increased germination rate over control at 5 mM, however by increasing zinc concentration, the speed of germination was significantly decreased in comparison with the control. Lead was found to penetrate thick seed coat of this plant and affects its germination and growth rate. Soybean plants is a non-tolerant plant to lead during its germination and initial growth. The toxic effects of lead may be observed in low concentrations (5 mM) since they significantly reduce germination percentage. The decrease in seed germination can be attributed to alterations of selection permeability properties of cell membrane. Also, it seems that soybean plants cannot be tolerated by these elements because of their genetic and inductive ability. The reason for low tolerance against both metals might be due to changes in the physiological mechanism in seed germination and seedling growth of plant.

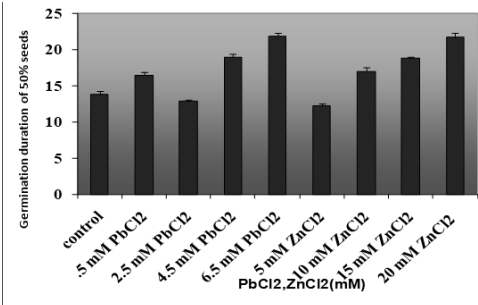
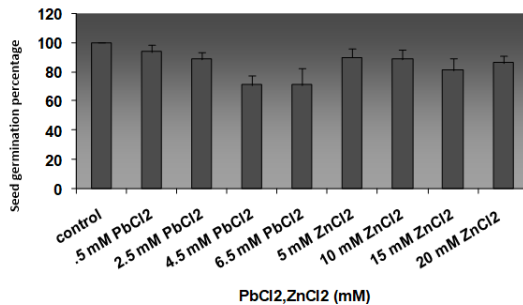


Fig 1. Effect of different concentrations of PbCl2 and ZnCl2 on soybean seed germination percentage

Fig 2. Effect of different concentrations of PbCl2 and ZnCl2 on the duration of germination of 50% of soybean seeds

Biography

Elham Abedi has studied in plant physiology. She received her B.S. and M.S. degrees in plant physiology from the Department of basic science, Isfahan University, and Science and Research Branch, Islamic Azad University, Tehran, Iran, respectively. In 2015, she started her Ph.D. in the same department where her thesis was about the Effect of different concentrations of Nanoparticles on germination and some physiological and biochemical parameters of *Dorema ammoniacum* D. Don. She has worked in evaluation of some physiological parameters in several poaceae family plants under in vitro stresses, such as heavy metal and salt. Now she has focused on selenium supplement on endemic species plants.

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